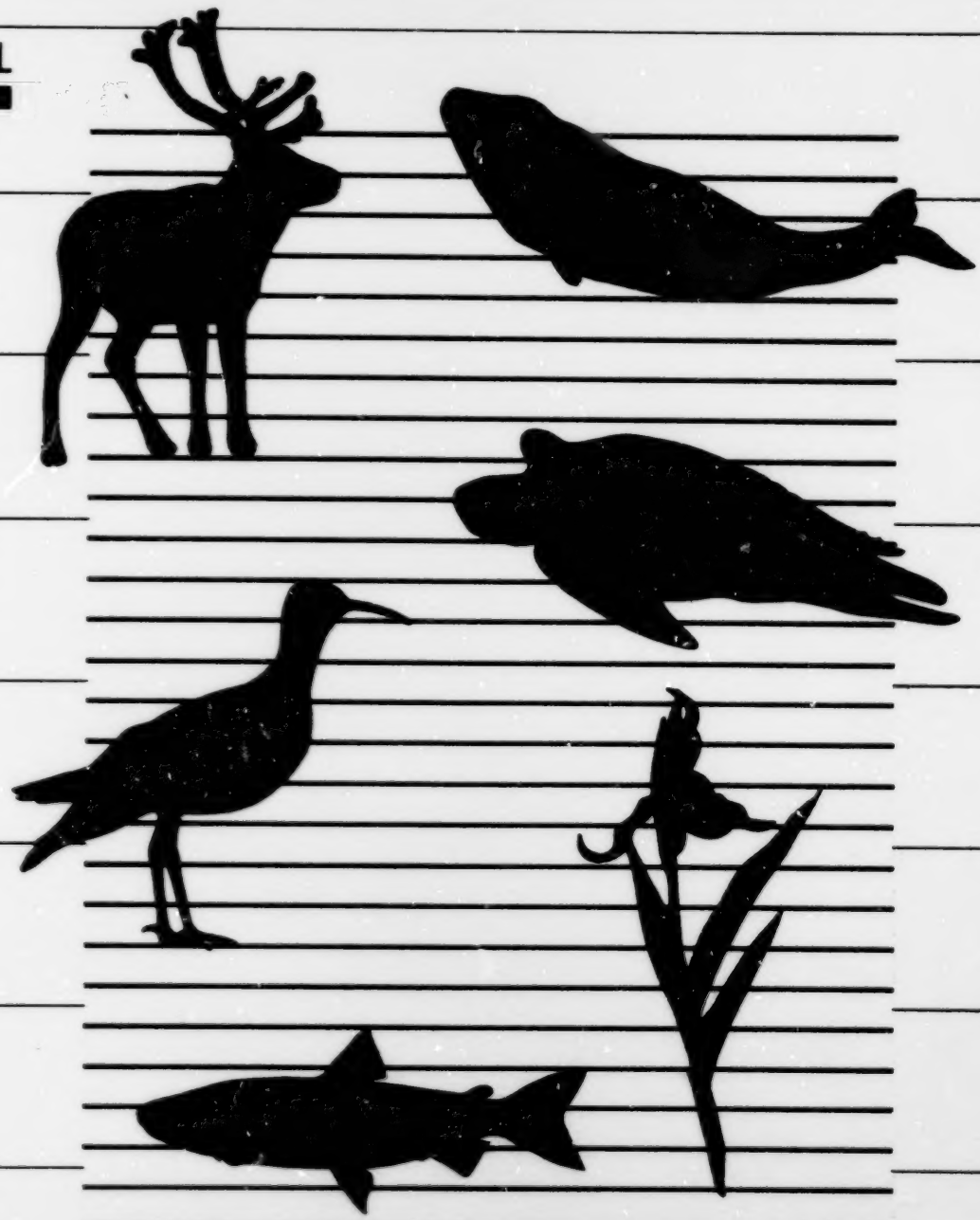
Environment Canada
Canadian Wildlife Service

Environnement Canada
Service canadien de la faune

C3

ENDANGERED SPECIES CONSERVATION PROGRAM 1985/86 – 1989/90

A PROPOSAL



Canada

ENDANGERED SPECIES CONSERVATION PROGRAM 1985/86 — 1989/90

A PROPOSAL

J.P. Foley
Canadian Wildlife Service
30 May 1984

Watch for this loon on blue signs marking National Wildlife Areas and Migratory Bird Sanctuaries

EXECUTIVE SUMMARY

There are 42 officially recognized threatened and endangered species of wild animals and plants in Canada. There are a further 60 species whose survival is in doubt and on which status reports are being prepared. On the broader scale, both the World Conservation Strategy and the Global 2000 Report consider that the loss of genetic diversity, otherwise known as extinction, is one of the major conservation issues facing mankind. The Global 2000 Report estimates that 15 to 20% (one-two million) species of plants, and animals could disappear by the turn of the century.

Relatively little effort has been made in Canada to address this issue either within the country or abroad. In addition, because of the twelve provincial/territorial governments, and several federal departments who have jurisdiction, plus the major work of non-governmental organizations, considerable cooperative effort is required if the work is to be done in the best possible manner.

The present proposal is designed to provide an overall strategy under which all jurisdictions and the private sector can coordinate their efforts. The proposal also provides for increased federal financial support, and actions appropriate for the federal wildlife agency in meeting its national and international responsibilities.

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CONTENTS

Page

Introduction 1

Problem 2

Factors 2

Proposed Actions 6

National 7

- Identification of Endangered Species 7
- Research and Recovery Programs 8
- Protection of Species and Their Habitats 9
- Public Awareness 10

International 11

- Cooperation on Shared/Dependent Populations 11
- Cooperation and Assistance on Shared/Dependent Populations 11
- Assistance on Non-shared Populations 11
- Agreements 12
- Public Awareness 12

Financial Considerations for CWS 13

Appendices 14

I Map of Wildlife Regions
II The Players
III Role and Duties of the Endangered Species Coordinator
IV COSEWIC Definitions
V Complete COSEWIC List
VI CWS Endangered Species Expenditures 1983/84 According to the Framework of this Proposal

INTRODUCTION

Wildlife, particularly endangered wildlife in this country, and throughout the world, is faced with many dangers ranging from over-exploitation to loss of habitat. An additional threat is that conservation efforts, both globally and within Canada, have been hampered by jurisdictional questions related to who has the authority and responsibility to take action at any particular time or place. The following proposal is simply an attempt to provide a framework and stimulus in which the conservation efforts of the various levels of government and the private sector in Canada can be channeled to increase the efficiency and effectiveness of all these efforts. It represents a concrete example of the "teamwork" approach outlined by Norm Simmons in his address to the 1983 Federal-Provincial Wildlife Conference. The proposal does not assume any shift in the current roles and responsibilities of the various levels of government or government departments, nor does it assume that any further endangered species legislation is necessary. However, it proposes that the federal government make financial contributions to work done by other governments and the private sector.

Although it is a CWS initiative, the fact that the proposal involves the federal, provincial and territorial governments and the private sector, it is really a "national" strategy in the sense that to be truly successful the participation of the majority of those involved in the conservation of endangered wildlife in Canada will be necessary.

PROBLEM

There are already 42 species of Canadian wildlife that are officially listed as *threatened, endangered or extirpated at the national level. There are a further 60 under investigation. In addition, the World Conservation Strategy points out that the loss of diversity of wildlife species is one of the world's major conservation issues. It is also estimated in the Global 2000 report to the President that up to two million species throughout the world may become extinct by the turn of the century.

While an effort is being made in Canada to address this problem, there are too few resources and very little strategic planning or coordination.

FACTORS

1. Threats to the world's wildlife populations including endangered species stem from a variety of sources. The following are the three most important:
   a) loss of habitat such as the draining of wetlands for agricultural purposes, or the clearing of forests for lumber or firewood;
   b) habitat degradation due to industrial activity, use of pesticides or numerous other activities of man;

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* This proposal will deal with threatened as well as endangered and extirpated as it is essential for both efficiency and effectiveness to deal with cases before they reach the critical endangered category. The proposal does not deal specifically with rare species since these may be rare naturally and are not necessarily threatened. It is assumed that species in this category are routinely monitored since because of their rarity they could easily become threatened or endangered. See Appendix IV for COSEWIC definitions of rare, threatened, endangered and extirpated.

c) over-exploitation of wildlife populations for food, clothing or other purposes such as ornamental ivory carvings, aphrodisiacs and trophies.

2. Wildlife often cross national boundaries, or live in international territory, and it is often difficult, if not impossible, to coordinate or implement international conservation measures. The decline of the whale stocks is a good example of this lack of international conservation. There are also many examples of birds being protected in one part of their range and over-exploited in another.

3. In Canada, the responsibility for wildlife conservation is distributed among the federal, provincial and territorial governments. While there are many individual examples of cooperative work on endangered species conservation, it is very fragmented.

4. Non-governmental organizations play an extremely important role in wildlife conservation in Canada. Organizations such as the Canadian Nature Federation (CNF), the World Wildlife Fund Canada (WWF-C), the Canadian Wildlife Federation (CWF), and Ducks Unlimited (DU), have contributed an enormous amount of effort, expertise and money over the years to wildlife conservation. Operators of zoological parks, aquaria, game farms, etc., have played a vital role in the past in the protection and maintenance of gene pools of endangered species. Other actors such as universities and the RCMP have also played important roles in the past, and must continue to do so.* Again, however, the work on endangered species in general is very fragmented, and lacks coordination.

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* See Appendix II for a more complete list of players.

5. Wildlife legislation in general, and endangered species legislation in particular, in Canada is rather uneven. Most provincial or territorial wildlife legislation is limited to certain species (primarily game animals), and only Ontario and New Brunswick currently have specific endangered species acts. The Federal Ministry of the Environment may conduct research on its own, but management of endangered species other than migratory birds or on federal lands must be done in cooperation with the province or territory involved. Because of this lack of consistent legislation, effective cooperative planning is therefore, essential.

6. It is sometimes difficult for regional governments to justify work on species which are of global ecosystematic value, but not of local economic importance. For example there is little work being done to conserve invertebrates in Canada.

This proposal is designed to flow from, and be a natural extension of, other guiding documents. The most important of these are as follows:

a) The World Conservation Strategy (1981)

Environment Canada has endorsed the strategy in principle, and is committed to lead and coordinate its implementation in areas of federal jurisdiction. One of the three main objectives of the WCS is "to preserve genetic diversity". In other words, prevent extinctions.

A follow-up recommendation adopted by the federal government is to "offer to cooperate with provincial governments in development of complementary and/or joint federal/provincial conservation strategies for sustainable development of living resources".

b) Guidelines for Wildlife Policy in Canada (1982)

This paper was produced by the Federal-Provincial Wildlife Conference and was approved by the Wildlife Ministers Conference. It was designed to "form a framework within which government and non-government organizations can develop their own policies and programs, and a statement of the general direction in which wildlife conservation should move in the next decade". Of particular interest is the fact that one of the three stated goals is to "preserve the genetic diversity of wildlife".

Further, one of the elements or actions to consider is to participate in international conservation. This is to "ensure the continuing availability of resources which are or could be shared with other countries; and, second, to contribute to the maintenance of mankind's global heritage ...".

c) Federal Wildlife Policy

While this policy is currently being drafted, there are certain principles which can be clearly identified. For example, the federal government has an interest in matters of national or international significance, and one of its major functions is to play a leadership role in these matters. This proposal is based on these principles.

d) Canada's Threatened Species and Habitats (1977)

The Canadian Nature Federation and the World Wildlife Fund co-sponsored this the first and only national symposium on endangered species. Fourteen recommendations were approved. Some have been acted upon, such as the one that led to the establishment of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Other recommendations have not yet been acted upon at all, or there is much work yet to be done. This proposal attempts to address the following:

"That the Federal government make full use of its existing jurisdiction and powers to initiate programs of research and management on endangered and threatened species and habitats within the provinces and territories."

"That under the provisions of the Canada Wildlife Act, the Federal government seek to enter into many more agreements with the provinces and territories whereby more Federal funds would be available for research and management of threatened and endangered species and habitats under provincial jurisdiction."

"That the Federal and Provincial governments establish or review mechanisms to receive applications for funds for research to determine the status of species or groups that are possibly endangered or threatened."

PROPOSED ACTION

To develop and implement a national strategy to conserve nationally endangered species in Canada and abroad.

This proposal is based on the following principles:

1. Responsibility for wildlife conservation in Canada is shared among the federal, provincial and territorial governments, and therefore work on endangered species must also be a shared responsibility.

2. Wildlife populations do not respect administrative or political boundaries. This strategy will, therefore, be based on* natural regions.

3. NGOs, universities, and other private sector groups, have played a vital role in the past in protecting endangered species, and they must continue to be integral players in a national strategy.

4. Canada, as a developed country, has a responsibility to contribute to conservation of the global wildlife heritage.

The proposed strategy contains the following elements:

1. NATIONAL

a) Problem Identification

Threatened and endangered species and their habitats will continue to be identified through the work of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and the Canadian Council on Ecological Areas (CCEA).

Since any work on endangered species is dependent on knowing their status, a concerted effort will be made over the next three years to produce status reports on all species currently thought to be at risk of extinction. COSEWIC estimates that status reports are urgently required on about 60 species. These reports average $2,000 each for a total of $120,000. Since these are of national or international concern, the Federal Government will be the single largest

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* This is essentially a country-wide extention of the "Great Plains Rehabilitation Project" proposed some years ago.

the Federal Government will be the single largest source of funds. The remainder will be matched by other government agencies and the private sector. DOE will also provide funds for regional participation in COSEWIC as it does with CCEA to ensure that COSEWIC is truly national in scope, and not merely a reflection of the federal government.

Environment Canada has in fact, committed itself to "accelerate" this process of identifying species at risk in the implementation of the World Conservation Strategy.

b) Research and Recovery Programs

Emphasis will be placed on the following areas of research:

- basic ecosystematic problems affecting endangered wildlife such as pesticides and other toxic chemicals;
- reproductive biology;
- factors affecting successful reintroduction.
- research required to produce status reports.
- determination of appropriate distribution and population levels as targets for recovery.
- investigations of genetic drift and diversity.

All levels of government and universities can contribute to these basic research areas. DOE will augment its current research in this area by devoting additional O&M each year. It will also set up a fund to which universities or other institutions can apply for research support. CWS will serve as a clearing house for information on all research.

The recovery program will include:

- rearing of populations in captivity, including possibly setting up sperm/ovary banks;
- reintroducing endangered or extirpated populations to their former range, or ensuring that adequate gene pools survive in captivity;
- management and protection of existing populations including captive, reintroduced and natural. The enforcement of laws and regulations will be a major activity in this component.

Most of the reintroduction and management will be done through Federal-Provincial agreements, using regular operation and maintenance funds. However, government contributions will be made to operators of game farms, zoos and aquaria to assist work on endangered species. NGO contributions to individual projects will play a particularly important role in this area.

An essential part of this proposal is that the Federal Government will contribute to provincial funds for recovery work up to a set amount on an annual basis. However, the actually funding formula will be very flexible. A significant proportion of the additional funds identified for CWS will be devoted to contributing to work being done by others. For example, an annual research fund would be made available to universities applying to do research on endangered species.

c) Protection of Species and Their Habitats

A habitat protection plan will be facilitated by DOE with the major input being from the provinces and territories. The plan will include all possible means of protection from ecological reserves,

provincial parks to national wildlife areas. DOE will contribute to habitat protection by creating National Wildlife Areas and Migratory Bird Sanctuaries if appropriate or by making direct financial contributions to Habitat Canada and the work of the Canadian Council on Ecological Areas (CCEA). NGOs such as Ducks Unlimited could play an extremely important role in this area.

d) Public Awareness Programs

While government agencies will put some effort into public awareness programs, this is an area where the NGOs have, and will continue to play, a major role. DOE will budget a certain amount of O&M for this each year.

Natural Regions

As the national recovery strategy will be based on natural regions rather than on political or administrative boundaries, the defined natural regions and examples of species involved are as follows:

*1) The Arctic

Peary caribou, **Eskimo curlew

2) The Prairies

ferruginous hawk, greater prairie chicken, burrowing owl, swift fox, black-footed ferret, long-tailed weasel

3) The Boreal Forest

wood bison, whooping crane

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* The "natural regions" chosen are quite clearly broad and may have to be further refined for operational planning. However, for strategic planning and communication purposes, it is an advantage to keep the categories to a minimum, to those which people can easily relate to. See Appendix I for a map illustrating these regions.

** Obviously some species nest in or migrate through more than one natural region. Again, however, there is an advantage for keeping it simple for strategic planning and communications purposes. See Appendix V for a complete list of COSEWIC Status Reports and ratings.

4) The Mountains

5) The Great Lakes - St. Lawrence

Kirtland's warbler, beluga, small white ladies slipper

6) The Atlantic Region

piping plover, right whale, bowhead whale, eastern cougar

7) The Pacific Region

Vancouver Island marmot, sea otter, humpback whale

2. INTERNATIONAL

The international program will have the following elements:

a) cooperative research and management of shared/dependent wildlife populations with countries having adequate expertise and resources. An example, is the CWS work with the U.S. Fish and Wildlife Service on whooping cranes.

b) cooperating with and providing assistance (expertise and financial) to countries sharing dependent populations, but having limited resources. An example, could be a project to assist Mexico in protecting burrowing owls.

c) providing assistance to developing countries for the protection of wildlife not shared directly by Canada, but valued as a part of its global heritage. For example, Canada may choose to get involved in the Indian Save The Tiger Project. The federal government will make financial and technical contributions to such projects and provide assistance through agencies like CIDA.

NGOs, particularly WWF, have played extremely important roles in such projects in the past and presumably will continue to do so.

d) agreements to control international trade to reduce the markets and, therefore, the demand for endangered wildlife or their parts. Canada currently contributes to this through CITES, and will increase its contribution through the proposed Wildlife Import/Export Act.

e) Public Awareness Programs. An example, is the National Museums travelling exhibit on migratory birds in the Caribbean. Again, the federal government can and will play a role here along with the major NGOs.

FINANCIAL CONSIDERATIONS FOR CWS* - O&M

	85/86	86/87	87/88	88/89	89/90	
1. National						
a) Problem Identification	30	30	30	20	20	
b) Research and Recovery	75	75	75	85	85	
c) Protection of Species and Habitats	75	75	75	75	75	
d) Public Awareness	15	15	15	15	15	
	195	195	195	195	195	975
2. International						
a) Cooperation on Shared/ Dependent Populations	25	25	25	25	25	
b) Cooperation and Assistance with Shared/Dependent Populations	25	25	25	25	25	
c) Assistance with Non-shared Populations	15	15	15	15	15	
**d) Agreements	10	10	10	10	10	
e) Public Awareness	15	15	15	15	15	
	90	90	90	90	90	450
***Coordinator	15	15	15	15	15	75
	300	300	300	300	300	1500K

* These figures represent additions to current CWS O&M resources being devoted to these areas. See Appendix VI for current figures and projects.

** Note that a separate submission has been made under the "Proposal for an Export, Import and Interprovincial Transport of Wildlife Act for Canada". This proposal includes 85K annual O&M.

*** One new PY will be required for the coordinator position. This figure does not include Salary. See Appendix III for proposed duties.

LIST OF APPENDICES

I Map of Wildlife Regions

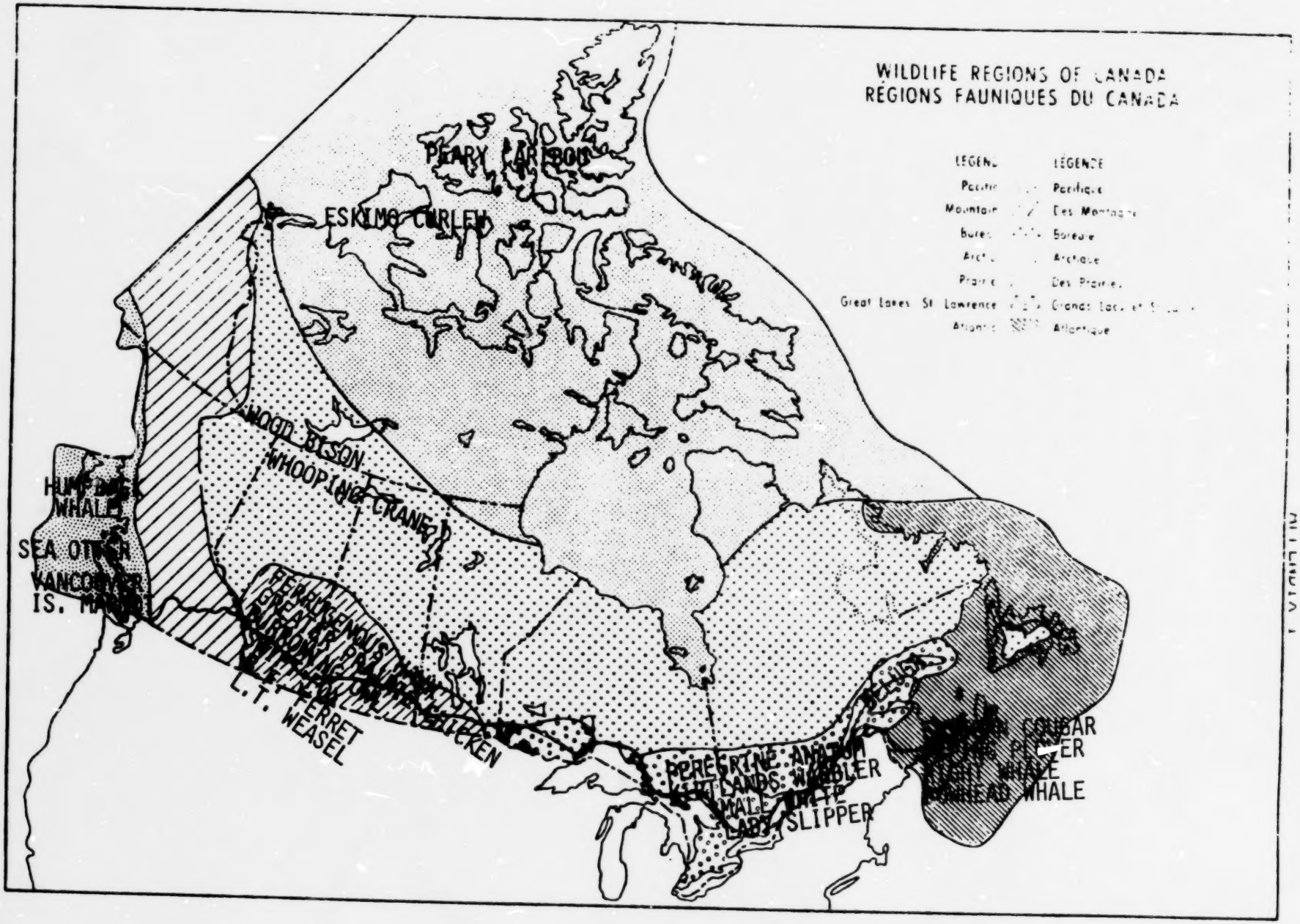
II The Players

III Role and Duties of the Endangered Species Coordinator

IV COSEWIC Definitions

V Complete COSEWIC List

VI CWS Endangered Species Budgets (1983/84) According to the Framework of this Proposal


WILDLIFE REGIONS OF CANADA
RÉGIONS FAUNIQUES DU CANADA
LEGEND
LÉGENDE
Pacific
Pacifique
Mountain
Des Montagnes
Boreal
Boréale
Arctic
Arctique
Prairie
Des Prairies
Great Lakes St Lawrence
Grands Lacs et St-Laurent
Atlantic
Atlantique
PEARY CARIBOU
ESKIMO CURLEW
WOOD BISON
WHOOPING CRANE
HUMPBACK WHALE
SEA OTTER
VANCOUVER IS. MARMOT
FERRUGINOUS HAWK
GREATER PRAIRIE CHICKEN
BURROWING OWL
SWIFT FOX
L.T. FERRET
WEASEL
PEREGRINE
ANDROSACE
KITTLANDS WILLOW
SMALL WHITE LADY SLIPPER
COUGAR
PIPING PLOVER
RIGHT WHALE
BOWHEAD WHALE

APPENDIX II

THE PLAYERS

1. The Federal Government
   a) The Canadian Wildlife Service
   b) Parks Canada
   c) National Museum of Natural Sciences
   d) Fisheries and Oceans Canada
   e) Agriculture Canada (Biosystematics Research Institute)
   f) Canadian Forestry Service
   g) External Affairs (Export/Import Permits Act and CIDA)
   h) Revenue Canada (Customs)
   i) Solicitor General (RCMP)

2. The Provincial and Territorial Governments
   a) Wildlife Agencies
   b) Parks Agencies
   c) Museum
   d) Fishery Agencies
   e) Forestry Agencies
   f) Police
   g) Universities

3. Non-Governmental Organizations and Individuals
   a) Wildlife Organizations (e.g., WWF and CWF)
   b) Operators of Zoos, Aquaria, etc.
   c) Landowners
   d) Interested Citizens
   e) Native Organizations

APPENDIX III

Role and Duties of the Endangered Species Coordinator

1. Develop a National Strategy.
2. Work with NGOs, provinces, territories and other federal agencies for acceptance and implementation of the National Strategy.
3. Ensure work of COSEWIC (status reports) are used as basis for work on endangered species within CWS.
4. Develop national research strategy and coordinate via LTOPs CWS contribution. Do the annual multi-agency roll-up.
5. Develop national recovery strategy and coordinate CWS input. Do the annual multi-agency roll-ups.
6. Develop habitat protection strategy and coordinate interagency implementation.
7. Liaise with Information Service to produce public awareness plan for them to implement.
8. Serve as liaison person with U.S. to develop and implement cooperative program.
9. Develop and implement plans to cooperate and assist developing countries in plans for shared populations.
10. Assess which projects in developing countries without shared populations CWS should be contributing to either financially through IUCN or through expertise and advice, if sought, through CIDA.
11. Ensure the efforts of CITES and other international agreements related to endangered species conservation in which Canada is involved are included in the national roll-up.
12. Produce a Canadian Endangered Species Conservation liaison directory.
13. Administer grant applications.
14. Work with CCEA on threatened habitat identification.
15. Work with the National Museums on their endangered species data base.

Committee on the Status of Endangered Wildlife in Canada

Comité sur le statut des espèces menacées de disparition au Canada

Ottawa, Ont. K1A 0E7 (613) 997-4991

LIST OF SPECIES WITH DESIGNATED STATUS AS OF APRIL 1984

*N.I.A.C. = NOT IN ANY CATEGORY

BIRDS

SPECIES	STATUS
WHITE PELICAN	THREATENED
DOUBLE-CRESTED CORMORANT	N.I.A.C.
TRUMPETER SWAN	RARE
FERRUGINOUS HAWK	THREATENED
GYRFALCON	N.I.A.C.
PEREGRINE FALCON:	
PEALEI	RARE
TUNDRIUS	THREATENED
ANATUM	ENDANGERED
GREATER PRAIRIE CHICKEN	ENDANGERED
WHOOPING CRANE	ENDANGERED
GREATER SANDHILL CRANE	N.I.A.C.
PIPING PLOVER	THREATENED
ESKIMO CURLEW	ENDANGERED
IVORY GULL	RARE
CASPIAN TERN	RARE
BURROWING OWL	THREATENED
GREAT GRAY OWL	RARE
KIRTLAND'S WARBLER	ENDANGERED
IPSWICH SPARROW	RARE
ROSS' GULL	RARE
RED-NECKED GREBE	N.I.A.C.
PRAIRIE FALCON	N.I.A.C.
RED-SHOULDERED HAWK	RARE
COOPER'S HAWK	RARE
PROTHONOTARY WARBLER	RARE
HENSLOW'S SPARROW	THREATENED
EASTERN BLUEBIRD	RARE
BARN OWL	RARE
BALD EAGLE	N.I.A.C.

MAMMALS

SPECIES	STATUS
EASTERN MOLE	RARE
VANCOUVER ISLAND MARMOT	ENDANGERED
BLACK-TAILED PRAIRIE DOG	RARE
FOX SQUIRREL	N.I.A.C.
POCKET GOPHER	RARE
RIGHT WHALE	ENDANGERED
BOWHEAD WHALE	ENDANGERED
SWIFT FOX	EXTIRPATED
GREY FOX	RARE
GRIZZLY BEAR	N.I.A.C.
NEWFOUNDLAND MARTEN	N.I.A.C.
BLACK-FOOTED FERRET	EXTIRPATED
BADGER	N.I.A.C.
SEA OTTER	ENDANGERED
EASTERN COUGAR	ENDANGERED
PEARY CARIBOU	THREATENED
WOOD BISON	ENDANGERED
WOLVERINE	RARE
LONG-TAILED WEASEL (PRAIRIES)	THREATENED
HUMPBACK WHALE	THREATENED
ST. LAWRENCE BELUGA	ENDANGERED
BLUE WHALE	RARE
MOUNTAIN BEAVER	N.I.A.C.
QUEEN CHARLOTTE ISLANDS ERMINE	RARE
WOODLAND CARIBOU: (BY POPULATION)	
DAWSON WOODLAND CARIBOU	EXTINCT
WESTERN WOODLAND CARIBOU	RARE
NORTHEASTERN WOODLAND CARIBOU	N.I.A.C.
MARITIME WOODLAND CARIBOU	THREATENED
NEWFOUNDLAND WOODLAND CARIBOU	N.I.A.C.

FISH

SPECIES	STATUS
SHORTNOSE STURGEON	RARE
SPECKLED DACE	RARE
GIANT STICKLEBACK	RARE
BLUEBACK HERRING	N.I.A.C.
SPOTTED GAR	RARE
SPOTTED SUCKER	RARE
SILVER SHINER	RARE
RIVER REDHORSE	RARE
CHARLOTTE UNARMOURED STICKLEBACK	RARE
ACADIAN WHITEFISH	ENDANGERED
SHORTHEAD SCULPIN	THREATENED

PLANTS

SPECIES	STATUS
FURBISH LOUSEWORT PEDICULARIS FURBISHIAE	ENDANGERED
SMALL WHITE LADY SLIPPER CYPRIPEDIUM CANDIDUM	ENDANGERED
WILLOW SALIX PLANIFOLIA TYRRELLII	THREATENED
THRIFT ARMERIA MARITIMA INTERIOR	THREATENED
SMALL WHORLED POGONIA ISOTRIA MEDEOLOIDES	ENDANGERED
KENTUCKY COFFEE TREE GYMNOCLADUS DIOICA	THREATENED
BLUE ASH FRAXINUS QUADRANGULATA	THREATENED
BROAD BEECH FERN PHEGOPTERIS HEXAGONAPTERA	RARE
SOUTHERN MAIDENHAIR FERN ADIANTUM CAPILLUS-VENERIS	ENDANGERED
GREEN DRAGON ARISAEMA DRACONTIUM	RARE
PLYMOUTH GENTIAN SABATIA KENNEDYANA	THREATENED
PINK COREOPSIS COREOPSIS ROSEA	ENDANGERED
FALSE MERMAID FLOERKEA PROSERPINACOIDES	N.I.A.C.
AMERICAN WATER-WILLOW JUSTICIA AMERICANA	THREATENED
SHUMARD OAK QUERCUS SHUMARDII	RARE
HOP TREE PTELEA TRIFOLIATA	RARE
GIANT HELLEBORINE EPIPACTIS GIGANTEA	THREATENED
CUCUMBER TREE MAGNOLIA ACUMINATA	ENDANGERED
PINK MILKWORT POLYGALA INCARNATA	ENDANGERED
MOSQUITO FERN AZOLLA MEXICANA	THREATENED

REPTILES AND AMPHIBIANS

SPECIES	STATUS
LEATHERBACK TURTLE	ENDANGERED

APPENDIX IV

COSEWIC DEFINITIONS

SPECIES: "Species" means any species, subspecies, or geographically separate population.

RARE SPECIES: Any indigenous species of fauna or flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reason, exists in low numbers or in very restricted areas in Canada but is not a threatened species.

THREATENED SPECIES: Any indigenous species of fauna or flora that is likely to become endangered in Canada if the factors affecting its vulnerability do not become reversed.

ENDANGERED SPECIES: Any indigenous species of fauna or flora whose existence in Canada is threatened with immediate extinction through all or a significant portion of its range, owing to the action of man.

EXTIRPATED SPECIES: Any indigenous species of fauna or flora no longer existing in the wild in Canada but existing elsewhere.

EXTINCT SPECIES: Any species of fauna or flora formerly indigenous to Canada but no longer existing anywhere.

APPENDIX VI

CWS Endangered Species Budgets (1983/84) According to the Framework of this Proposal

	PYs	SAL	CAP	O&M
1. National				
a) Status Reports	2.5	78.1		11.0
b) Res. & Recov.	8.5	273.2		133.7
c) Habitat				
d) Public Awareness				
2. International				
*a) Coop.				
b) Coop. & Assist.				
c) Assist				
d) Agreements	3.0	105.8		157.0
e) Public Awareness				
	13.5	457.1		301.7

* Resources are being expended here, but they are currently very difficult to sort out from 1(b).

POOR

QUALITY

ORIGINAL